CLAIMS

We claim:

1. A DSL modem comprising:

a bandwidth allocator adapted to dynamically adjust a bandwidth allocation based on voice channel demand, the bandwidth allocation defining a bandwidth for each of one or more voice channels and unchannelized data; and

a formatter coupled to the bandwidth allocator, the formatter adapted to combine the voice channels and unchannelized data onto a digital subscriber line according to the bandwidth allocation, thereby creating a transmission signal.

2. The DSL modem of claim 1, further comprising:

an off-hook detector coupled to the bandwidth allocator, the off-hook detector adapted to couple to one or more local customer premises voice lines for measuring voice channel demand thereon.

3. The DSL modem of claim 2, further comprising:

a next-format storage coupled to the off-hook detector for storing a next bandwidth allocation, the next bandwidth allocation based on a detected change in voice channel demand.

4. The DSL modem of claim 1, wherein the transmission signal includes next bandwidth allocation data, the next bandwidth allocation data defining an anticipated bandwidth for the voice channels and data.

5. The DSL modem of claim 1, wherein the bandwidth for each voice channel is associated with a timeslot in the transmission signal, the remaining transmission signal bandwidth available for data.

6. The DSL modem of claim 5, wherein the bandwidth allocator is adapted to adjust the bandwidth allocation at integer multiples of the periodicity of the timeslots.

7. The DSL modem of claim 1, wherein the formatter is adapted to format the transmission signal into a series of superframes, each superframe including a plurality of network frames, each network frame including a plurality of low-level frames, each low-level frame including a plurality of timeslots, the timeslots containing a voice call or data.

8. The DSL modem of claim 7, wherein the bandwidth allocator is adapted to adjust the bandwidth allocation at the frequency of the superframe.

9. The DSL modem of claim 7, wherein the network frames are synchronized to a telephone-network timing reference.

10. The DSL modem of claim 1, wherein at least one voice channel includes voice data selected from the group consisting of: voice data, facsimile data, analog modem data, and digital service data.

11. The DSL modem of claim 1, wherein the DSL modem is a central office modem.

12. A DSL modem comprising:

a DSL connection for transmitting information over a digital subscriber line;

a module coupled to the DSL connection for transmitting channelized data and unchannelized data over the digital subscriber line, the module adapted to dynamically allocate bandwidth for transmitting the channelized data based on availability of channelized data, and to dynamically reallocate unused channelized data bandwidth for transmitting the unchannelized data.

13. A method of dynamically allocating bandwidth in a digital subscriber line among channelized data from one or more local phone lines and unchannelized data, the method comprising:

establishing a connection to a digital subscriber line;

allocating a portion of the bandwidth for each of the local phone lines in use, the remaining bandwidth available for unchannelized data;

transmitting the channelized and unchannelized data over the digital subscriber line in their respective allocated bandwidths;

detecting a change in phone line usage; and

reallocating the bandwidths among the local phone lines and unchannelized data based on the detected change.

14. The method of claim 13, further comprising:

transmitting a bandwidth allocation over the digital subscriber line, the bandwidth allocation defining bandwidths corresponding to the channelized and unchannelized data.

15. The method of claim 13, wherein the bandwidths allocated for each of the local phone lines in use are substantially equal and are capable of carrying a voice call.

16. A method of transmitting voice calls and digital data over a digital subscriber line, the method comprising:

transmitting digital data over the digital subscriber line in a bandwidth;

detecting a new voice call;

responsive to the new voice call, dynamically reallocating a first portion of the bandwidth to the voice call and a second portion of the bandwidth to the digital data; and

combining the voice call in the first portion of the bandwidth and the digital data in the second portion of the bandwidth for transmitting over the digital subscriber line.

17. The method of claim 16, wherein the first portion of the bandwidth is outside POTS band frequencies.

18. The method of claim 16, wherein the voice call includes data selected from the group consisting of: voice data, facsimile data, analog modem data, and digital service data.

19. The method of claim 16, further comprising:

responsive to the voice call's ending, reallocating the first portion of the bandwidth to the digital data.

20. A method of dynamically allocating bandwidth among voice and data traffic, the bandwidth comprising a plurality of timeslots, the method comprising:

allocating timeslots among the voice and data traffic;

composing a first superframe, the first superframe containing a plurality of network frames, each network frame containing a plurality of low-level frames, each low-level frame containing the voice and data traffic in their allocated timeslots;

sending the first superframe over a digital subscriber line;

in response to detecting a change in the voice traffic demand, reallocating the timeslots among the voice and data traffic;

composing a second superframe, the second superframe containing a plurality of network frames, each network frame containing a plurality of low-level frames, each low-level frame containing the voice and data traffic in their reallocated timeslots; and

sending the second superframe over the digital subscriber line.

21. The method of claim 20, wherein composing the first superframe includes synchronizing the network frames to a telephone-network timing reference.

22. The method of claim 20, further comprising:

sending a next allocation of the timeslots over the digital subscriber line to the remote modem, the next allocation being encoded within the current superframe.